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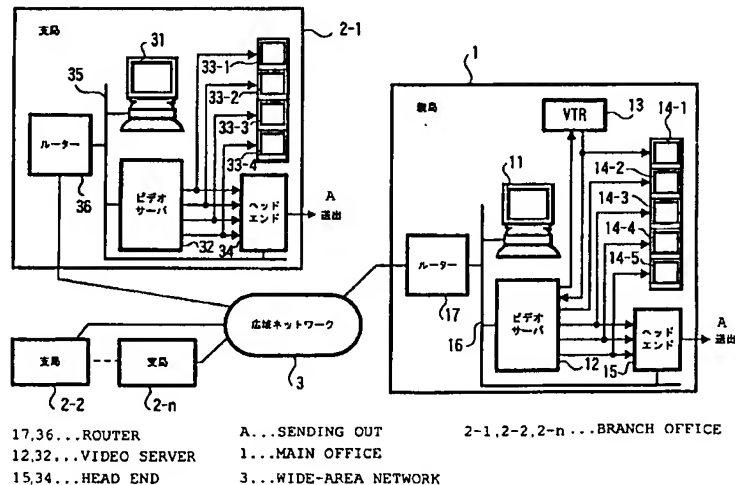
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(54) Title: DATA SENDING DEVICE AND DATA SENDING METHOD

(54) 発明の名称: データ送出装置及びデータ送出方法



(57) Abstract: A main office (1) for preparing a play list indicating a material sending schedule and branch offices (2-1 to 2-n) for sending materials based on the play list are connected together via a network (3); the main office (1) is provided with an attribute imparting means (11) for imparting to the prepared play list an attribute indicating a sending stand-by, and with a transferring means (11) for transferring to the branch offices (2-1 to 2-n) information on the prepared play list and the attribute imparted to the play list via a network (3); and the branch offices (2-1 to 2-n) are each provided with a time setting means (31) for setting time, and with a sending stand-by means (31) for judging from this information on the attribute whether or not this attribute is imparted at this set time to the play list transferred from the main office (1), and for performing a sending stand-by based on this attribute-imparted play list. A CATV branch office now can perform a sending stand-by based on the play list distributed from the main office without involvement by branch office members.

[続葉有]

I, Tadahiko Itoh, a Patent Attorney of Tokyo, Japan having my office at 32nd Floor, Yebisu Garden Place Tower, 20-3 Ebisu 4-Chome, Shibuya-Ku, Tokyo 150-6032, Japan do solemnly and sincerely declare that I am the translator of the attached English language translation and certify that the attached English language translation is a correct, true and faithful translation of Japanese Patent Application No. 2001-097136 to the best of my knowledge and belief.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



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This is to certify that the annexed is a true copy
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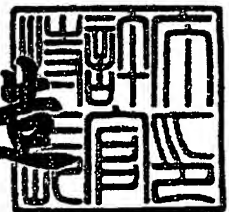
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[Title of the Invention] IMAGE RECORDING APPARATUS

[Claims]

- 5 [Claim 1] An image recording apparatus comprising:
- a coding/decoding part having a plurality of coding/decoding modes of different bit rates;
- a recording medium coupled with said coding/decoding part; and
- 10 a control part setting a predetermined bit rate to be applied by said coding/decoding part in case an input image signal is output after being coded and decoded without storage thereof in said recording medium.
- 15 [Claim 2] The image recording apparatus as claimed in claim 1, wherein the predetermined bit rate is that on such a mode of the plurality of coding/decoding modes as to provide the highest image quality.
- 20 [Claim 3] The image recording apparatus as claimed in claim 1, wherein the predetermined bit rate is further higher than that on such a mode of the plurality of coding/decoding modes as to provide the highest image quality.
- 25 [Claim 4] An image recording apparatus comprising:
- a coding/decoding part performing coding and decoding a given image by different bit rates;
- a recording medium coupled with said coding/decoding part; and
- 30 a control part automatically setting a predetermined bit rate to be applied by said coding/decoding part according to a predetermined parameter concerning recording of a given image
- 35 signal to be recorded into said recording medium.
- [Claim 5] The image recording apparatus as claimed in claim 4, wherein:

the predetermined parameter includes a remaining storage capacity A (bytes) of said recording medium; a time T (seconds) of recording reserved; a maximum available recording bit rate Rmax (bps); and a minimum available recording bit rate Rmin (bps); and

said control part determines the bit rate R (bps) by which the recording is performed such as that satisfying the following formula:

10 $T \times R/8 \leq A$

 wherein, $R = R_{\max}$ when $R > R_{\max}$; and
 $R = R_{\min}$ when $R < R_{\min}$.

[Claim 6] The image recording apparatus as claimed in claim 4, wherein:

15 the predetermined parameter includes a remaining storage capacity A (bytes) of said recording medium; a time T (seconds) of recording reserved; and a minimum available recording bit rate Rmin (bps); and

20 said control part determines the bit rate R (bps) by which the recording is performed such as that satisfying the following formula:

$T \times R/8 \leq A$

 wherein $R = R_{\min}$ when $R < R_{\min}$.

25 [Claim 7] An image recording apparatus comprising:

 a coding/decoding part performing coding and decoding a given image by different bit rates;

30 a recording medium coupled with said coding/decoding part; and

 a control part causing an input image signal to be automatically recorded into said recording medium even if no instructions for recording the input image signal is given, and
35 causing the image signal thus recorded into the recording medium to be accessible when predetermined instructions concerning the image signal is given.

[Claim 8] The image recording apparatus as claimed in claim 7, wherein said control part does not perform the automatic recording of the image signal when the remaining storage capacity of the recording medium is less than a predetermined value.

[Claim 9] The image recording apparatus as claimed in claim 7, wherein said control part causes the image signal to be automatically recorded into a file, which a user cannot access, of the recording medium.

[Claim 10] The image recording apparatus as claimed in claim 1, wherein control information concerning the image signal is divided and recorded into the recording medium in a directory area thereof and also the image signal separately.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to an image recording apparatus including a recording medium which stores an image signal and a voice signal, and, in particular, to an image recording apparatus which has coding/decoding function for the image signal or voice signal.

[0002]

[Prior Art]

In recent years, image recording apparatuses which encode and compress (that is, encode by a predetermined compression form) input image signals (or video signals) and audio signals into MPEG 2 PS or TS data, store them, and, then, decode and decompress (that is, decode by a predetermined decompression form) them have been put into the market of public welfare apparatuses. Such image recording apparatuses employ magnetic-disk recording media, or, recently, DVDs, as data recording media. In particular, an apparatus using a magnetic-disk

recording medium is called a HDD recorder.

[0003]

Generally, this type of image recording apparatus can perform recording/reproducing by a plurality of conditions, such as a high-quality mode, a standard mode, a low-quality (but long time recordable) mode, and so forth, by controlling data coding conditions, appropriately. Furthermore, as the seek time is shortened for such a recording medium as magnetic-disk recording medium, a so-called "time-shift function" is attained in which an arbitrary position of an image file can be reproduced while the same file is recorded onto the disk recording medium.

15 [0004]

Such an image recording apparatus generally has an input terminal through which image signal and audio signal to be recorded is input from an external apparatus such as a DVD player, and, an output terminal through which reproduced image signal and audio signal are output to an external apparatus such as a TV set. The image recording apparatus includes a coding/decoding circuit to code the input image signal or audio signal by a predetermined compression form and decode the image signal or audio signal read out of the recording medium by a predetermined decompression form.

[0005]

Then, there is a case where, the image recording apparatus, being connected to a DVD player or a television set, outputs signals output by the DVD player to the television set without storing the signal therein. In such a case, when the image recording apparatus has a special path for bypassing the signals, the signals output by the DVD player are output as they are through this special path directly to the television set.

[0006]

[Problems to be Solved by the Invention]

However, when the image recording apparatus
does not have such a bypass, there is a following
5 problem.

[0007]

When the image recording apparatus does not
have a bypass, the image signal and audio signal
supplied externally are output after being once
10 coded, compressed, stored, decompressed and decoded.
In such a case, when the coding/decoding bit rate
has been set relatively lower (for example, on a
standard mode or above-mentioned low-quality (but
long time recordable) mode) in the recording
15 apparatus, the thus-output signals after being thus
coded, stored and decoded are those somewhat
degraded in quality. Thereby, the quality in image
and audio thus output via the output external
apparatus such as a television set is not a
20 satisfactory one.

[0008]

An object of the present invention is to solve
the above-mentioned problem, and, to provide an
image recording apparatus by which, even when input
25 image signals are coded, compressed, decompressed,
and decoded to pass through to outside, the image
quality is not degraded problematically.

[0009]

[Means to Solve the Problems]

30 According to the present invention, an image
recording apparatus includes a coding/decoding part
having a plurality of coding/decoding modes of
different bit rates; a recording medium coupled with
the coding/decoding part; and a control part setting
35 a predetermined bit rate to be applied by the
coding/decoding part in case an input image signal
is output after being coded and decoded without

storage thereof in a recording medium.

[0010]

Thereby, even in case where input image signal is coded and decoded to be output without storage thereof, a predetermined bit rate is set in the coding/decoding part. Thus, degradation in image signal quality may be effectively reduced by setting the bit rate relatively high.

[0011]

10 [Embodiments of the Invention]

FIG. 1 is a block diagram showing an image recording apparatus according to one embodiment of the present invention. The image recording apparatus includes a tuner 11, which is connected to an antenna 10, an NTSC decoder 12, an audio A-D converter (ADC) 13, an MPEG 2 encoder 14, an MPEG 2 decoder 18, an NTSC encoder 22, and an audio D-A converter (DAC) 23. The tuner 11, NTSC decoder 12, audio A-D converter 13, and MPEG 2 encoder 14 constitute an input system of the image recording apparatus, while the MPEG 2 decoder 18, NTSC encoder 22, and audio D-A converter 23 constitute an output system thereof. An analog image signal from outside or the tuner 11 is given to the NTSC decoder 12 through an input terminal 29, and an analog audio signal is given to the audio A-D converter 13 through an input terminal 30. An analog image signal which the NTSC encoder 22 outputs is provided to an external apparatus, such as a television set, through an output terminal 31. An analog audio signal which the audio D-A converter 23 outputs is provided to the external apparatus through an output terminal 31.

[0012]

35 The MPEG 2 encoder 14 has a video encoder 15, an audio encoder 16, and a multiplexer 17. The MPEG 2 decoder 18 has a de-multiplexer 19, a video

decoder 20, and an audio decoder 21.

[0013]

Further, the image recording apparatus has a CPU 24, an FPGA (Field Programmable Gate Array, referred to as a controller, hereinafter) 25, an SDRAM (Synchronous Dynamic Random Access Memory) 26, an ATAPI (ATA Packet Interface, referred to as an interface part, hereinafter) 27, and an HDD (Hard Disk Drive) 28.

10 [0014]

The video encoder 15 of the MPEG 2 encoder 14 carries out coding and compressing of the image signal decoded by the NTSC decoder 15, and outputs it to the multiplexer 17. The compression form of, for example, MPEG 2-Video is used for this coding and compressing. The audio encoder 16 carries out coding and compressing of the digital audio signal output from the audio A-D converter 13, and outputs it to the multiplexer 17. The compression form of MPEG 1 Audio Layer 2 is used for this coding and compressing. The multiplexer 17 multiplexes the thus-provided image signal and audio signal, and thus, outputs a stream. For example, an MPEG 2 system PS form is used for this multiplexing.

25 [0015]

The MPEG 2 encoder 14 has a plurality of coding modes (also called image quality modes or operation modes) for determining the bit rate in coding the image signal according to the compression form such as MPEG. For example, the MPEG 2 encoder 14 has three modes, i.e., a high-definition mode (also called a High Quality mode; HQ mode), a standard mode (also called a Standard Play mode; SP mode), and a low image quality mode (also called a Long Play mode; LP mode). The coding bit rate in the high-definition mode is, for example, 10 Mbps, including a bit rate of 9.744 Mbps on image signal

and a bit rate of 256 kbps on audio signal. The bit rate in the standard mode is, for example, 4 Mbps, including a bit rate of 3.744 Mbps on image signal and a bit rate of 256 kbps on audio signal. The bit rate in the low image quality mode is, for example, 2 Mbps, including a bit rate of 9.744 Mbps on image signal and a bit rate of 256 kbps on audio signal.

[0016]

The de-multiplexer 18 of the MPEG 2 decoder 18 separates an incoming signal into an image signal and an audio signal. The video decoder 20 carries out decoding and decompressing of the image signal coded according to the predetermined compression form. The audio decoder 21 carries out decoding and decompressing of the image signal on which coding compressing was carried out. The MPEG 2 decoder 18 has a plurality of decoding modes for determining the bit rate in carrying out the decoding and decompressing of the image signal corresponding to the above-mentioned decoding modes in the MPEG 2 encoder 14. Thus, there are three modes, i.e., a high-definition mode, a standard mode, and a low image quality mode, as in the MPEG 2 encoder 14.

[0017]

The controller 25 controls data transfer between the MPEG 2 encoder 14, MPEG 2 decoder 18, CPU 24, SDRAM 26, and the interface part 27, and programs for many gates so as to execute control sequences for the data transfer. Moreover, the controller 25 also has a function of outputting control information for the respective parts according to control information supplied by a user using a remote controller, etc. This will be described later.

[0018]

The SDRAM 26 once stores a predetermined coded signal from the MPEG 2 encoder 14, and the coded

signal read out from the HDD 28. The thus-stored coded signal is read out from the SDRAM 26, and is output to the HDD 28 or the MPEG 2 decoder 18. The interface part 27 performs interface for the HDD 28 or another external recording apparatus.

[0019]

The CPU 24 controls the entire image recording apparatus.

[0020]

The tuner 11 is an option, and, thus, may be excluded from the image recording apparatus.

[0021]

FIG. 2 shows functions of the image recording apparatus shown in FIG. 1. The functions are set as a user inputs a mode from the outside to the controller 25 as will be described later. The image recording apparatus has a HDD recording function, a HDD reproduction function, a recording/reproduction function to perform recording and reproduction simultaneously, and a digital through reproduction function, which is provided in this embodiment. The digital through reproduction function is such that, thereby, image and audio signals pass the following route:

Image signal: input terminal 29 (or tuner 11) → NTSC decoder 12 → MPEG 2 encoder 14 → controller 25 → SDRAM 26 → controller 25 → MPEG 2 decoder 18 → NTSC encoder 22 → output terminal 31.

Audio signal: input terminal 30 (or tuner 11) → audio A-D converter 13 → MPEG 2 encoder 14 → controller 25 → SDRAM 26 → controller 25 → MPEG 2 decoder 18 → audio D-A converter 23 → output terminal 32.

[0022]

The bit rate of image coding and decoding in the digital through reproduction function is

determined by either of the following two methods.
According to the first method, the bit rate on the
mode by which the highest quality of image is
obtained. According to the present embodiment, the
5 HQ mode provides the highest quality of image.
Accordingly, when the digital through reproduction
function is set, the mode of the MPEG 2 encoder 14
and MPEG 2 decoder 18 is automatically set as the HQ
mode. This mode setting is performed by a user's
10 instruction of a mode from outside to the controller
25. When the mode is thus set, the controller 25
outputs the control signal which gives instructions
for the HQ mode to the MPEG 2 encoder 14 and MPEG 2
decoder 18 accordingly.

15 [0023]

According to the second method, when setting of
the bit rate which exceeds that on the HQ mode in
the MPEG 2 encoder 14 and MPEG 2 decoder 18 is
possible, the highest settable bit rate is set. For
20 example, in case the HQ mode has the bit rate of 10
Mbps, and the MPEG 2 encoder 14 and MPEG 2 decoder
18 can have further higher bit rate, i.e., 12 Mbps,
the bit rate of 12 Mbps is set there. However, any
bit rate, other than 12 Mbps, exceeding 10 Mbps may
25 also be set instead.

[0024]

Since processing is performed through the
above-mentioned route by the bit rate set by either
of the above-mentioned methods, degradation of the
30 quality of image of the signal which only passes
through the image recording apparatus can be
controlled to the minimum one. Setting of the
above-mentioned bit rate is performed by
instructions given by the controller 25.

35 [0025]

Thus, features of the image recording apparatus
according to the embodiment of the present invention

focused on the above function are having a coding/decoding part (14, 18) which has a plurality of coding/decoding modes of different bit rates; a recording medium (28) coupled with the coding/decoding part; and a control part (25) which, in case an input image signal is output without being stored into the recording medium, sets a predetermined bit rate (for example, the bit rate on the HQ mode) in the coding/decoding part.

10 [0026]

The above-mentioned HDD recording function has two functions, i.e., a reservation recording function and a manual recording function. According to the reservation recording function, a just recording mode is prepared in addition to the above-mentioned HQ mode, SP mode and LP mode. According to the manual recording mode, in addition to the above-mentioned three modes, an LP automatic shift mode, which is provided in this embodiment, is prepared. The above-mentioned recording/reproduction function has an HDD recording/reproduction function of reproducing image and audio signals from the HDD 28 while recording of the image and audio signals onto the HDD 28 is performed, and a recording/digital through reproduction function, which is provided in this embodiment. The recording/digital through reproduction function is such that, thereby, the data is passed through according to the above-described digital through reproduction function while recording of the image and audio signals on the HDD 28 is performed. In this case, the coding bit rate for the image signal recorded onto the HDD 28 is one determined by the above-described first or second method.

35 [0027]

With reference to FIG. 3, the above-mentioned

just recording mode will now be described. FIG. 3 is a flow chart of operation performed by the CPU 24 on the above-mentioned just recording mode. A user inputs recording reservation instructions and a recording mode to be selected to the controller 25 by using the remote controller, etc. The controller 25 outputs these commands to the CPU 24. The CPU 24 receives the recording reservation command from the controller 25, in a step S11. Then, the CPU 24 makes the following determination:

$$T \times R(m)/8 > A$$

where: T denotes a recording reserved time (seconds); A denotes the remaining storage capacity (bytes) of the HDD; and R(m) denotes the bit rate (bps) on the mode m. Here, it is assumed that m = 1 on the HQ mode; m = 2 on the SP mode; and m = 3 on the LP mode. The remaining storage capacity means a storage capacity in the HDD 28 remaining and be able to be used for stream recording.

[0028]

The CPU 24 makes setting such that $R = R(m)$ when the determination result on the step S12 is NO, that is, when the reserved recording can be completed by the bit rate in the currently set recording mode. That is, the bit rate R applied at the time of actually recording is set to be the bit rate R(m) on the currently set mode. On the other hand, when the determination result on the step S12 is YES, that is, when the reservation recording cannot be completed by the bit rate on the currently set recording mode, the CPU 24 determines the largest bit rate R from among the bit rates which satisfy the following requirement in a step S14:

$$R \leq A/T \times 8$$

However, when the thus-determined R is smaller than the minimum recording bit rate Rmin permitted by the system, it is set that $R = Rmin$. The above-

mentioned largest bit rate R may be the largest one from among the predetermined modes $R(m)$, or may be an arbitrary one from among those within a range permitted by the system. That is, when R exceeds
5 the maximum recording bit rate R_{max} permitted by the system, setting is made such that $R = R_{max}$.

[0029]

Then, the recording reservation including the information on the bit rate determined at the step
10 S13 or S14 is set in a step S15.

[0030]

Thus, recording by the bit rate according to the remaining storage capacity of the HDD 28 can be performed on the reservation recording efficiently,
15 providing relatively satisfactory image quality.

[0031]

The above-mentioned LP auto shift function will now be described with reference to FIG. 4. FIG. 4 is a flow chart which shows operation of the CPU 24
20 performed when the LP auto shift function is set.

[0032]

The LP auto shift function is one of the manual recording functions, and when the remaining storage capacity on the HDD 28 becomes lower than a
25 predetermined value, the recording mode is automatically shifted to the LP mode.

[0033]

First, a user inputs recording reservation instructions and a recording mode to be selected to
30 the controller 25 by using the remote controller, etc. The controller 25 outputs these commands to the CPU 24. The CPU 24 receives the recording reservation command from the controller 25, in a step S21. Then, in a step S22, the CPU 24 checks
35 the remaining storage capacity A on the HDD 28. Then, the CPU 24 determines in a step S23, whether the remaining storage capacity A is larger than a

threshold Amin. The threshold Amin is used for determining as to whether shift is to be made to the LP mode. When it is not that $A > A_{min}$, the CPU 24 makes a setting such that $R = R(3)$ in a step S24.

5 That is, the bit rate at the time of recording is made to be the bit rate on the LP mode, and thus, the SP mode is set. When $A > A_{min}$, the CPU 24 makes a setting such that $R = R(m)$ in a step S25. That is, the CPU 24 sets the bit rate on the currently set
10 recording mode $R(m)$. Then, the CPU 24 makes recording start in a step S24.

[0034]

After the start of recording, the CPU 24 determines in a step S27 whether or not $A > A_{min}$.
15 According to the determination result, the CPU 24 makes a setting such that $R = R(3)$ in a step S28, or makes a setting such that $R = R(m)$ in a step S29. Then, in a step S30, the CPU 24 determines whether or not the recording is finished. When this
20 determination result is NO, in a step S31, the CPU 24 determines whether or not A is almost equal to zero. When this determination result is NO, processing is returned to the step S27. When the determination result on the step S30 is NO, or when
25 the determination result on the step S31 is YES, the CPU 24 terminates the recording in a step S32.

[0035]

Thus, by repeating the processing on the steps S27 through S31 until the recording is finished or
30 until the remaining storage capacity becomes nearly equal to zero, the operation mode is automatically made into the LP mode in case the remaining storage capacity becomes smaller. Thereby, it is possible to record image and audio signals onto the HDD 28
35 for a longer time.

[0036]

The present invention has various features

other than the above-described ones, which will become apparent from descriptions of the preferred embodiment which will be described now in more detail.

5 [0037]

FIG. 5 is a block diagram showing the image recording apparatus in the embodiment of the present invention which corresponds to the configuration shown in FIG. 1. The reference numerals obtained through adding 100 to the reference numerals of the components shown in FIG. 1 are given to the corresponding components in FIG. 5.

[0038]

An NTSC decoder 112 is of SAA7113H provided by Philips, for example. The NTSC decoder 112 converts an NTSC image signal to a YC-multiplexed 8-bit parallel signal. An audio A-D converter 113 is of PCM1800 made by Burr-Brown, for example, and outputs a digital signal according to I²S. An MPEG 2 encoder 114 is of MB86390A of Fujitsu, for example, and compresses an input image signal into MPEG 2 MP@ML, and compresses an input audio signal into MPEG 1 Layer 2 (thus, according to predetermined compression forms). The thus-compressed image signal and audio signal are multiplexed by a multiplexer prepared inside of the MPEG 2 encoder 114, and are output externally as a stream on MPEG 2 system, PS form. An MPEG 2 decoder 118 is of MB86373B by Fujitsu, and has inside thereof the NTSC encoder 22 shown in FIG. 1. An audio D-A converter 123 is of PCM1723 made by Burr-Brown, and converts the digital signal according to I²S into an analog signal. A CPU 124 is of MB91107 by Fujitsu, for example.

35 [0039]

Furthermore, the image recording apparatus shown in FIG. 5 has a display unit 138 including a

controller 125, an SRAM 126, an ATAPI interface part 127, a HDD 128, input terminals 129, output terminals 130, a remote controller input part 131, a mute filter part 134, a video amplifier 135, a
5 buffer 136, a CPU bus 137, a liquid crystal device, etc.

[0040]

The controller 125 has an ATAPI interface part 125a, an encoder DMAC (dynamic memory access
10 controller) 125b, a decoder DMAC 125c, a DISC (disk) DMAC 125d, a remote controller interface 125e, a serial interface 125f, a stream input interface 125g, an SDRAM interface 125h, a CPU bus interface 125i, a register 125j, and a stream output interface 125h.

15 [0041]

The ATAPI interface part 125a acts as an interface for the ATAPI interface part 127 through the buffer 136. The encoder DMAC 125b carries out DMA transfer of a stream (signal on which image
20 signal and audio signal are multiplexed) output from the encoder 114 to the SDRAM 126 through the stream input interface part 125g. Starting up and ending of the DMA transfer are performed by setting a predetermined code into a corresponding area of the
25 register 125j. The decoder DMAC 125c carries out DMA transfer of the stream from the SDRAM 126 to the decoder 118 through the stream output interface 125h. Starting up and ending of the DMA transfer are performed by setting a predetermined area of the
30 register 125j. The disk DMAC 125d carries out DMA transfer of data stored at an indicated address in the HDD 128 to the SDRAM 126. Starting up and ending of the DMA transfer are performed by setting a predetermined code in a corresponding area of the
35 register 125j. The remote controller interface 125e receives various commands from a remote controller, not shown in the figure, and sets predetermined

codes in a corresponding area of the register 125j accordingly.

[0042]

5 The serial interface 125f acts as an interface for outputting control signals, such as a mode setting signal, to the encoder 114. The SDRAM interface 125h acts as an interface for the SDRAM 126. The CPU bus interface 125i acts as an interface for the CPU bus 137.

10 [0043]

The CPU 124 controls each part through the CPU bus 124. For example, the CPU 124 checks a flag of the register 125j of the controller 125, and performs corresponding processing. Moreover, the
15 CPU 124 outputs control signals CNTL1 and CNTL2 to the audio D-A converter 123 or filter 134, and thus, controls the audio signal processed thereby.

[0044]

20 The input terminals 129 include a composite terminal, a Y terminal, and a C terminal. The input terminals 130 include an L (left) terminal and an R (right) terminal. The output terminals 131 include a composite terminal, a Y terminal, and a C terminal. The output terminals 132 include an L (left)
25 terminal and an R (right) terminal.

[0045]

FIG. 6 is a state transition diagram on the image recording apparatus shown in FIG. 5. In addition to the above-described HDD recording mode, HDD reproduction mode, recording/reproduction mode,
30 and digital through reproduction mode, the image recording apparatus has a file menu mode and a B file edit mode. These modes can be designated by operating buttons prepared on the remote controller, not shown in the figure. The buttons prepared on
35 the remote controller are shown in FIG. 6. For example, when a "file menu button" is operated on a

file menu mode, the digital through reproduction mode is selected. When a "recording button" is operated on this mode, the mode of image recording apparatus is shifted to the HDD recording mode.

5 [0046]

FIG. 7 shows allocation on a work area of the SDRAM 126. A memory area of the SDRAM 126 is divided into areas of an encoding processing part, a decoding processing part, and others. Each of these processing parts serve as ring buffers. For example, writing is started from a top address and, after the writing is finished to the last address continuously, writing is re-started from the top address, in case a stream is written to the encoding processing part. Each of the encoding processing part and decoding processing part are divided into 4 blocks, respectively. For example, the encoder DMAC 125b is started, and coding processing is started, as shown in a flow chart described later, in performing the HDD recording continuously. After the start of coding, a stream is written under control of the encoder DMAC 125b from the top address of the encoding processing part of SDRAM 126. When writing to the block 1 is finished, the stream written into the block 1 of the SDRAM 126 by the disk DMAC 125d is transferred to the HDD 128. During the transfer to the HDD 128, the encoder DMAC 125b transfers a stream to the block 2.

[0047]

30 The decoding processing part of the SDRAM 126 is used as follows: At a start of decoding, data is written into the HDD 128 under the control of the disk DMAC 125d from the top address of the decoding processing part of the SDRAM 126. When writing into the block 1 is finished, DMA transfer of the data written in the block 1 of the SDRAM 126 is carried out to the decoder 118 by the decoder DMAC 125c.

During the DMA transfer to the decoder 118, the disk DMAC 125d continuously writes data to the block 2 of the SDRAM 126.

[0048]

5 Operation of the HDD recording will now be described with reference to FIG. 8 in detail.

[0049]

10 The HDD recording is started as a user inputs the HDD recording mode (see FIG. 6) using the remote controller. The remote controller interface 125e of the controller 125 which receives this input writes a code corresponding to the HDD recording mode into a predetermined area of the register 125j. The CPU 124 accesses the register 125j periodically, and
15 detects that the HDD recording mode is thus set. Then, the CPU 124 writes a code corresponding to coding start at a predetermined area of the register 125j. The encoder DMAC 125b monitors the contents of the register 125j periodically. The encoder DMAC
20 125b starts operation, when it detects that the code for coding start is set (in a step S41). Then, the encoder DMAC 125b outputs a control code corresponding to coding start to the encoder 114 through the serial interface 125f (in a step S41).
25 The encoder 114 which receives this control code starts coding and compressing of an image signal given via the composite input terminal or Y terminal and C terminal, and then decoded by the NTSC decoder 112, and an audio signal given via the L terminal
30 and R terminal and then converted into a digital signal by the audio A-D converter 113 (in a step S42). The stream which the encoder 114 outputs is written into the encoding processing part (see FIG. 7) of the SDRAM 126 through the stream input
35 interface 125g of the controller 125. The encoder DMAC 125b determines constantly whether the writing for one block has been completed (in a step S43).

When the determination result of the step S43 is YES, the CPU 124 receives corresponding information from the encoder DMAC 125b, and writes a code corresponding to start of DMA transfer to the HDD 128 in a predetermined area of the register 125j. The disk DMAC 125d checks the register 125j periodically, and starts operation when detecting that the code corresponding to start of DMA transfer is set (in a step S44). Then, the disk DMAC 125d transfers one block of stream, writing of which has been completed, to the HDD 128 through the ATAPI interface 125a.

[0050]

The CPU 124 determines whether instructions of HDD recording stop is given (in a step S45). The instructions of HDD recording stop may be given by a user through the remote controller or a setting time on a timer is expired. The timer may be provided in a program which the CPU 124 performs. When the determination result on the step S45 is YES, the CPU 124 writes a code corresponding to coding stop in a predetermined area of the register 125j (in a step S46). The encoder 114 receives a corresponding control code from the controller 125, and terminates the coding and compressing processing. Moreover, the CPU 124 writes a code corresponding to DMA transfer stop of stream from the encoder 114 in a predetermined area of the register 125j (in a step S47). The encoder DMAC 125b detects this code and stops the DMA transfer. Furthermore, the CPU 124 writes a code corresponding to stop of DMA transfer to the HDD 128 in a predetermined area of the register 125j (in a step S48). The disk DMAC 125d detects this code and stops the DMA transfer.

[0051]

On the other hand, when the determination result on the step S45 is NO, the CPU 124 determines

as to whether there is a block, writing on which has been completed. When there is a block, writing on which has been completed, the processing is returned to the step S45. When there is no block, writing on
5 which has been completed, a step S50 is performed. In the step S50, the CPU 124 stops the DMA transfer to the HDD 128 as in the step S48. Then, the CPU 124 checks existence of a block, writing on which has been completed, again (in a step S51). When
10 there is a written block, the step S44 is returned to.

[0052]

In HDD recording processing shown in FIG. 8, processing of FIG. 3 and FIG. 4 which have been
15 described above is performed. For example, setting for the just recording mode shown in FIG. 3 is performed before starting of the HDD recording of FIG. 8. Moreover, in setting of the LP auto shift mode shown in FIG. 4, the step S26 corresponds to
20 the beginning of the flow chart of FIG. 8.

[0053]

Operation of reproducing data from the HDD 128 will now be described with reference to FIG. 9.

[0054]

25 The HDD reproduction is started as a user inputs selection of the HDD reproduction mode (see FIG. 6) using the remote controller. The remote controller interface 125e of the controller 125 which receives this input writes a code
30 corresponding to the HDD reproduction mode in a predetermined area of the register 125j. The CPU 124 accesses the register 125j periodically, and it detects that the HDD reproduction mode is thus set. Then, the CPU 124 writes a code corresponding to HDD
35 reproduction in a predetermined area of the register 125j. The disk DMAC 125d checks the contents of the register 125j periodically. The disk DMAC 125d

starts operation, when it detects that the code of the HDD reproduction is set (in a step S61). The disk DMAC 125d then reads a corresponding stream from the HDD 128, and writes it in the decoding
5 processing part (see FIG. 7) of the SDRAM 126 via the SDRAM interface 125h.

[0055]

The disk DMAC 125d constantly checks whether the writing of one block of stream has been
10 completed (in a step S62). When the determination result of the step S62 is YES, the CPU 124 receives this notice and writes a code which makes operation of the decoder 118 start in a predetermined area of the register 125j (in a step S63). The decoder DMAC
15 125c checks the register 125j periodically, and starts operation when detecting the code which makes operation of the decoder 118 start (in a step S64). One block of stream is read from the SDRAM 126, passes through the SDRAM interface 125h and stream
20 output interface 125h, and is supplied to the decoder 118.

[0056]

The CPU 64 determines whether instructions of stopping the HDD reproduction are given (in a step
25 S65). When the determination result of the step S65 is YES, the CPU 64 performs, steps S66 and S67 same as the steps S46 and S47 (see FIG. 8). Then, in a step S68, a code corresponding to stop of operation on the decoder 118 is written in a predetermined
30 area of the register 125j by the CPU 124. The decoder 135 which checks it stops the operation. When the determination result of the step S65 is NO, steps S69, S70, and S71 are performed same as the steps S49, S50, and S51 (see FIG. 8).

35 [0057]

FIG. 10 is a flow chart which shows operation of the digital through reproduction. As described

above, the digital through reproduction is one of features of the present invention.

[0058]

When a user gives instructions for the digital
5 through reproduction using the remote controller, a
corresponding code is written to a predetermined
area of the register 125j. The CPU 124 detects this
code and starts up the encoder DMAC 125b (in a step
S81) as in the step S41 (see FIG. 8). Then, steps
10 S82 and S83 same as the steps S42 and S43 mentioned
above are performed.

[0059]

Coding and compressing processing performed in
the step S82, as described above, is performed after
15 setting of a bit rate according either to the first
method in which the bit rate on the mode, among the
plurality of modes, by which the highest image
quality is obtained is set, or to the second method
in which, in case setting of a bit rate higher than
20 that on the HQ mode can be made on the encoder 114
and MPEG 2 decoder 118, the available highest bit
rate is set.

[0060]

According to the digital through reproduction,
25 input data is output without being written into the
HDD 128. Therefore, when it is determined that
writing of one block has been completed in the step
S83, in order to carry out decoding and
decompression of the data which has been coded and
30 compressed, processing by the decoder 118 is started
in a step S84. Processing in the step S84 is same
as that of the step S63 (see FIG. 9) mentioned above.
Then, the decoder DMAC 125c starts operation as in
the step S64 mentioned above, (in a step S85).

35 [0061]

The CPU 124 determines whether instructions of
stopping of the reproduction is given (in a step

S86). The instructions of stopping of the reproduction may be given by a user, for example. When the determination result of the step S86 is NO, the step S83 is returned to. On the other hand, 5 when the determination result of the step S86 is YES, the encoder 114 stops the coding and compressing processing as in the step S46 mentioned above (in a step S87). Moreover, the encoder DMAC 125b stops operation as in the step S47 mentioned above (in a 10 step S88). Furthermore, the decoder DMAC 125c stops operation as in the step S67 mentioned above (in a step S89). At the end, the decoder 118 stops operation as in the step S68 mentioned above (in a step S90).

15 [0062]

Operation of the file list display will now be described with reference to FIG. 11. When recording a stream into the HDD 128, the stream is treated as a file.

20 [0063]

FIGS. 12A and 12B illustrate an example (FIG. 12A) of a recording area of the HDD 128 and an example (FIG. 12B) of a stream recorded. As shown in FIG. 12A, the recording area of the HDD128 has a 25 FAT (File Allocation Table) area 128A, a root directory area 128B, and a disk area 128C. The FAT area 128A stores information (cluster numbers) which shows connection relationship of clusters which constitutes a file for every file according to 30 numbers (continuation numbers given to the clusters) of FAT entry. For example, as shown in FIG. 12B, a cluster number, such as 002H, is designated for each number of FAT entry. The cluster number given shows the number of a cluster connected subsequently. 35 Therefore, the file of FIG. 12B includes clusters of 002H, 003H, 005H, 006H, and 008H. That is, this file includes clusters recorded discontinuously, as

cluster 1, cluster 2, cluster 3, cluster 5, cluster 6, cluster 8, ..., in the disk area 128C. There, 000H means un-used one.

[0064]

5 Information recorded in the root directory area 128B is a part of information concerning files, and the remaining information (the others) concerning the files is recorded in a head or a tail end of each file stored in the disk area 128C. That is,
10 according to the present embodiment, information (file information) concerning files is divided and recorded into the root directory area 128B and disk area 128C separately. In contrast thereto, according to the related art, all the file
15 information is stored in the root directory area 128B.

[0065]

 The file information recorded in the root directory area 128B includes file names, extensions,
20 file sizes, first FAT entries, file creation dates or latest updated dates, and information concerning file attributes. Moreover, the file information recorded in the head or the tail end of each file is information concerning, for example, stream forms
25 (MPEG 2 PS/MPEG 2 TS/MPEG 1 System), bit rates, coding and compressing (encoding) modes (variable-length bit rates or fixed-length bit rates), video modes (NTSC, PAL, etc.), resolutions (HQ and SP, LP modes, etc., described above), and audio sampling
30 frequencies. This information is needed for decoding and decompressing processing by the decoder 118. That is, this information is added to the stream read out at the above-mentioned step S61.

[0066]

35 Thus, the file information recorded in the root directory area 128B is general information also usable by other various file systems. Therefore,

the information recorded in the root directory area 128B can also be used as it is, even when a different file system (for example, an HDD on a different type) is applied.

5 [0067]

Returning to FIG. 11, according to the file list display, on the display device 138, files stored in the disk area 128C of FIG. 12A are displayed, and then, the HDD reproduction, file
10 deletion, etc may be performed thereon. Through the ATAPI interface 125a of the controller 125, the CPU 124 reads the file information from the HDD 128, and stores it in a register in the decoder 118 (in a step S91). The CPU 124 displays information, such
15 as the file names, recording beginning dates/times, recording lengths, recording modes, etc., on the display device 138 using the file information stored in this register. An example of this display is shown in FIG. 13A. When a user views this display
20 contents and inputs a file to be reproduced (in a step S92), the CPU 124 which receives the input of the file through the controller 125 sends information on the thus-selected file to the disk DMAC 125d (in a step S93), and performs HDD
25 reproduction accordingly (in a step S94). The HDD reproduction in the step S94 is performed according to the procedure shown in FIG. 9.

[0068]

When the determination result of the step S92
30 is NO, the CPU 124 determines whether instructions of file deletion is given (in a step S95). Such instructions may be input by a user using the remote controller. When the determination result in the step S95 is YES, the CPU 124 sends information on
35 the selected file to the HDD 128 through the controller 125, buffer 136, and interface part 127 (in a step S97), and performs the file deletion (in

a step S97).

[0069]

The CPU 124 determines whether instructions for end of file list processing is given through the remote controller by the user (in a step S98). When this determination result is NO, the step S92 is returned to. When it is YES, the CPU 124 ends the display processing (in a step S99).

[0070]

10 With reference to FIGS. 13A through 15, the above-mentioned B file edit processing will now be described. Two file states A and B are used according to the present embodiment. The file state A is such that states of files are those in which a user can recognize on the recording file list shown in FIG. 13A. That is, files in the file state A are ordinary files. Files in the file state B are those which are not displayed on the above-mentioned recording file list. That is, files in the file state B are hidden, and, thus, cannot be accessed by a user (user inaccessible). Therefore, these files cannot be read out.

[0071]

25 According to the present embodiment, regardless of user's intention, when any empty space exists in the HDD 128, a given stream is automatically recorded in the above-mentioned state B, and, then, when the stream is needed by a user (for example, when the user finds out that a TV program should be recorded, after the broadcast of the TV program has been finished, or the user has forgotten to reserve recording), all or a part of the file thus recorded in the file state B is changed into the file state A.

[0072]

35 For example, as shown in FIG. 14A, in case files 1, 2 and 3 in the file state A are stored in the HDD 128, as shown in FIG. 14A, processing of

recording a file 4 in an empty area of the HDD 128 in the file state B is started from immediately after completion of recording of the file 3 (12:00 on March 9, 2000). This file 4 is a file of an image signal and an audio signal subsequently supplied to the input terminals 129 and 130. The recording of this file 4 is ended at 20:00 on March 9, 2000, as shown in the figure.

[0073]

10 A user who has forgotten to record a program to be saved in a videotape operates the remote controller, and gives instructions to display a display image concerning the B file edit shown in FIG. 13B (in a step S101). On the display image of
15 FIG. 13B, displayed are a storage possible time zone (12:00 on March 9, 2000 through 20:00 on March 9, 2000) for the file 4, shown in FIG. 14A, and two windows 151 and 152 by which a user can specify a file portion which the user actually needs to record.
20 The window 151 is used in order to specify date/time the recording starts, and the window 152 is used in order to specify date/time the recording ends. An example of FIG. 13B shows a state where the user has already input dates/times into the windows 151 and
25 152. The user specifies the date/time recording starts, and date/time recording ends using the remote controller (in steps S102 and S103). Then, when the user operates the remote controller so as to send instructions of storing information as a
30 file via the remote controller interface 125e, the data on the portion specified in the steps S102 and S103 is saved in the file state A in the HDD 128 (in a step S104).

[0074]

35 Thereby, as shown in FIG. 14B, the file 4 becomes a file in the file state A. Therefore, as the user requests a file list display, the display

contents thus becomes those as shown in FIG. 13C.
The file 4 which was not displayed in FIG. 13A is
then displayed in FIG. 13C.

[0075]

5 In addition, information concerning the file
states A and B is written as a part of file
information recorded, for example, in the above-
mentioned root directory 128B.

[0076]

10 Thus, when a vacant area (remaining storage
capacity) exists in the HDD 128, recording is made
thereto as a file in the file state B, regardless of
user's intention. When no vacant area remains, the
recording may be terminated, or, recording is
15 started from the top (oldest one) of the file
sequentially in an overwriting manner.

[0077]

 The embodiment of the present invention is
described above. Further, the present invention is
20 not limited to the above-described embodiment, and
variations and modifications may be made without
departing from the scope of the present invention.
For example, the HDD may be replaced by another
recording medium, such as a DVD, or the like.
25 Moreover, any television signal other than the NTSC
type one (for example, PAL type one, etc.) may also
be applied.

[0078]

 Some of the features of the present invention
30 are described below.

 (Additional remark 1) An image recording
apparatus including:

 a coding/decoding part having a plurality
of coding/decoding modes of different bit rates;

35 a recording medium coupled with said
coding/decoding part; and

 a control part setting a predetermined bit

rate to be applied by said coding/decoding part in case an input image signal is output after being coded and decoded without storage thereof in said recording medium.

5 (Additional remark 2) The image recording apparatus according to Additional remark 1, in which the predetermined bit rate is that on such a mode of the plurality of coding/decoding modes as to provide the highest image quality.

10 (Additional remark 3) The image recording apparatus according to Additional remark 1, in which the predetermined bit rate is further higher than that on such a mode of the plurality of coding/decoding modes as to provide the highest
15 image quality.

 (Additional remark 4) An image recording apparatus including:

 a coding/decoding part performing coding and decoding a given image by a plurality of bit
20 rates;

 a recording medium coupled with said coding/decoding part; and

 a control part automatically setting a predetermined bit rate to be applied by said
25 coding/decoding part according to a predetermined parameter concerning recording of a given image signal to be recorded into said recording medium.

 (Additional remark 5) The image recording apparatus according to Additional remark 4, in
30 which:

 the predetermined parameter includes a remaining storage capacity A (bytes) of said recording medium; a time T (seconds) of recording reserved; a maximum available recording bit rate
35 Rmax (bps); and a minimum available recording bit rate Rmin (bps); and

 said control part determines the bit rate

R (bps) by which the recording is performed such as that satisfying the following formula:

$$T \times R/8 \leq A$$

wherein, $R = R_{\max}$ when $R > R_{\max}$; and

5 $R = R_{\min}$ when $R < R_{\min}$.

(Additional remark 6) The image recording apparatus according to Additional remark 4, in which:

the predetermined parameter includes a
10 remaining storage capacity A (bytes) of said recording medium and decreases the bit rate R (bps) by which the recording is performed when the remaining storage capacity A of the recording medium is less than a predetermined value.

15 (Additional remark 7) The image recording apparatus according to Additional remark 4, in which:

the predetermined parameter includes a
remaining storage capacity A (bytes) of said
20 recording medium; a time T (seconds) of recording reserved; and a minimum available recording bit rate R_{\min} (bps); and

said control part determines the bit rate
R (bps) by which the recording is performed such as
25 that satisfying the following formula:

$$T \times R/8 \leq A$$

wherein $R = R_{\min}$ when $R < R_{\min}$.

(Additional remark 8) An image recording apparatus including:

30 a coding/decoding part performing coding and decoding a given image by different bit rates;

a recording medium coupled with said coding/decoding part; and

a control part causing an input image
35 signal to be automatically recorded into said recording medium even if no instructions for recording the input image signal is given, and

causing the image signal thus recorded into the recording medium to be accessible when predetermined instructions concerning the image signal is given.

5 (Additional remark 9) The image recording apparatus according to Additional remark 8, in which said control part does not perform the automatic recording of the image signal when the remaining storage capacity of the recording medium is less than a predetermined value.

10 (Additional remark 10) The image recording apparatus according to Additional remark 8, in which said control part causes the image signal to be automatically recorded into a file, which a user cannot access, of the recording medium

15 (Additional remark 11) The image recording apparatus according to Additional remark 1, in which control information concerning the image signal is divided and recorded into the recording medium in a directory area thereof and also the image signal
20 separately.

[0079]

[Effects of the Invention]

As described above, according to the present invention, an image recording apparatus is provided,
25 by which, even when input image signals are coded, compressed, decompressed, and decoded to be output without storage thereof, the image quality is not degraded problematically.

[Brief Description of the Drawings]

30 [Fig. 1]

A block diagram showing a configuration of an image recording apparatus according to one embodiment of the present invention.

[Fig. 2]

35 An illustration of functions of the image recording apparatus shown in FIG. 1.

[Fig. 3]

A flow chart which shows operation according to a just recording mode shown in FIG. 2.

[Fig. 4]

5 A flow chart which shows operation according to an LP auto shift mode shown in FIG. 2.

[Fig. 5]

A block diagram showing a configuration of the image recording apparatus according to the embodiment of the present invention.

10 [Fig. 6]

An illustration of a relationship between respective operation modes of the image recording apparatus shown in FIG. 5 and buttons on a remote controller.

15 [Fig. 7]

A diagram showing data allocation in a work area on an SDRAM shown in FIG. 5.

[Fig. 8]

20 A flow chart which shows an HDD recording operation of the image recording apparatus shown in FIG. 5.

[Fig. 9]

25 A flow chart which shows an HDD reproduction operation of the image recording apparatus shown in FIG. 5.

[Fig. 10]

A flow chart which shows a digital through reproduction operation of the image recording apparatus shown in FIG. 5.

30 [Fig. 11]

A flow chart which shows a file list display operation of the image recording apparatus shown in FIG. 5.

[Fig. 12]

35 Illustrations of a recording area of an HDD of the image recording apparatus shown in FIG. 5.

[Fig. 13]

Illustrations of file states A and B.

[Fig. 14]

Illustrations of an example of files stored in the HDD.

5 [Fig. 15]

A flow chart which shows a B file edit operation of the image recording apparatus shown in FIG. 5.

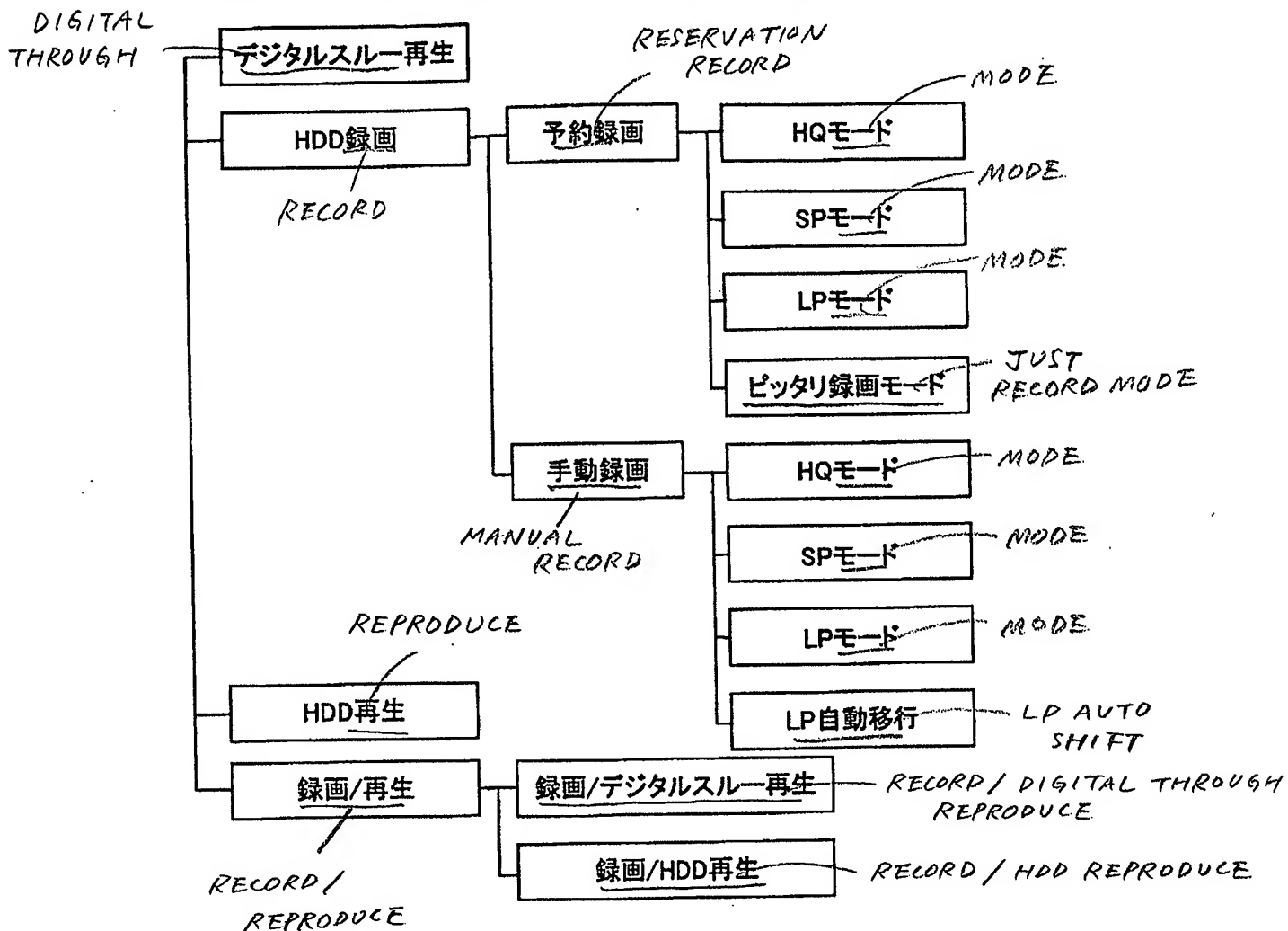
[Description of the Reference Numbers]

- 10 12: NTSC decoder
- 13: audio A-D converter
- 14: MPEG 2 encoder
- 15: video encoder
- 16: audio encoder
- 15 17: multiplexer
- 18: MPEG 2 decoder
- 19: de-multiplexer
- 20: video decoder
- 21: audio decoder
- 20 22: NTSC encoder
- 23: audio D-A converter
- 24: CPU
- 25: FPGA (controller)
- 26: SDRAM
- 25 27: ATAPI interface
- 28: HDD

【図2】FIG.2

ILLUSTRATION OF FUNCTION OF THE IMAGE RECORDING APPARATUS SHOWN IN FIG. 1

図1に示す画像記録装置の機能を説明するための図

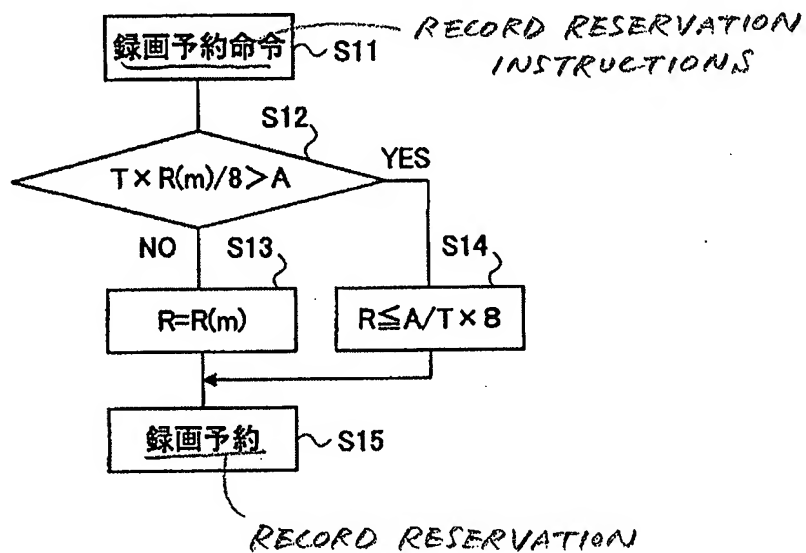


【図3】FIG.3

FLOW CHART WHICH SHOWS OPERATION ACCORDING TO
A JUST RECORDING MODE SHOWN IN FIG. 2

図2に示す機能のうちピッタリ録画モードの
動作を示すフローチャート

ピッタリ録画モード → JUST RECORD MODE



【図4】
FIG. 4
FLOW CHART WHICH SHOWS OPERATION
ACCORDING TO AN LP AUTO SHIFT MODE
SHOWN IN FIG. 2

図2に示す機能のうちLP自動移行モード
の動作を示すフローチャート

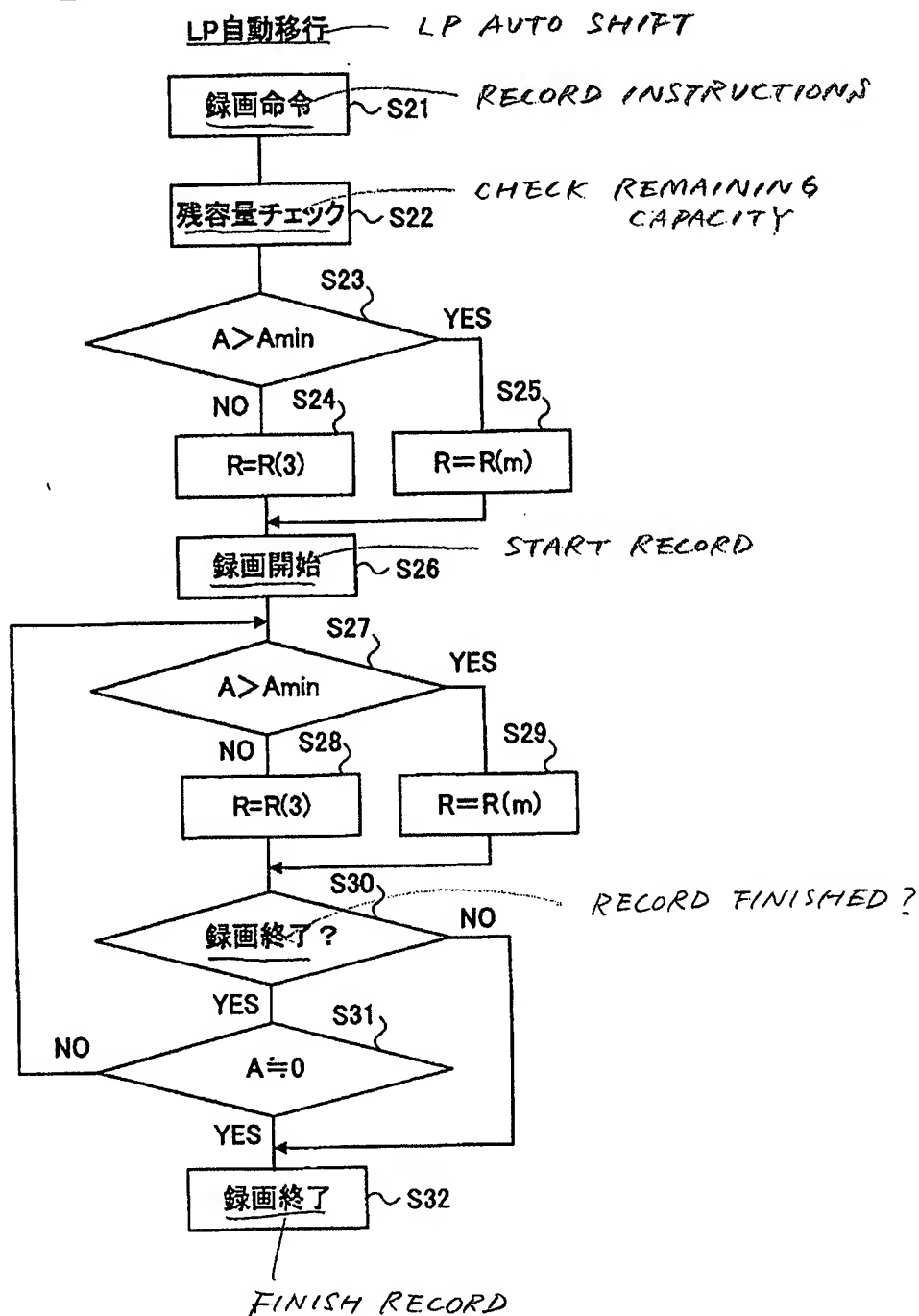


FIG. 5—[図5] BLOCK DIAGRAM SHOWING A CONFIGURATION OF THE IMAGE RECORDING APPARATUS ACCORDING TO THE EMBODIMENT OF THE PRESENT INVENTION

本発明の一実施例による画像記録装置の構成を示すブロック図

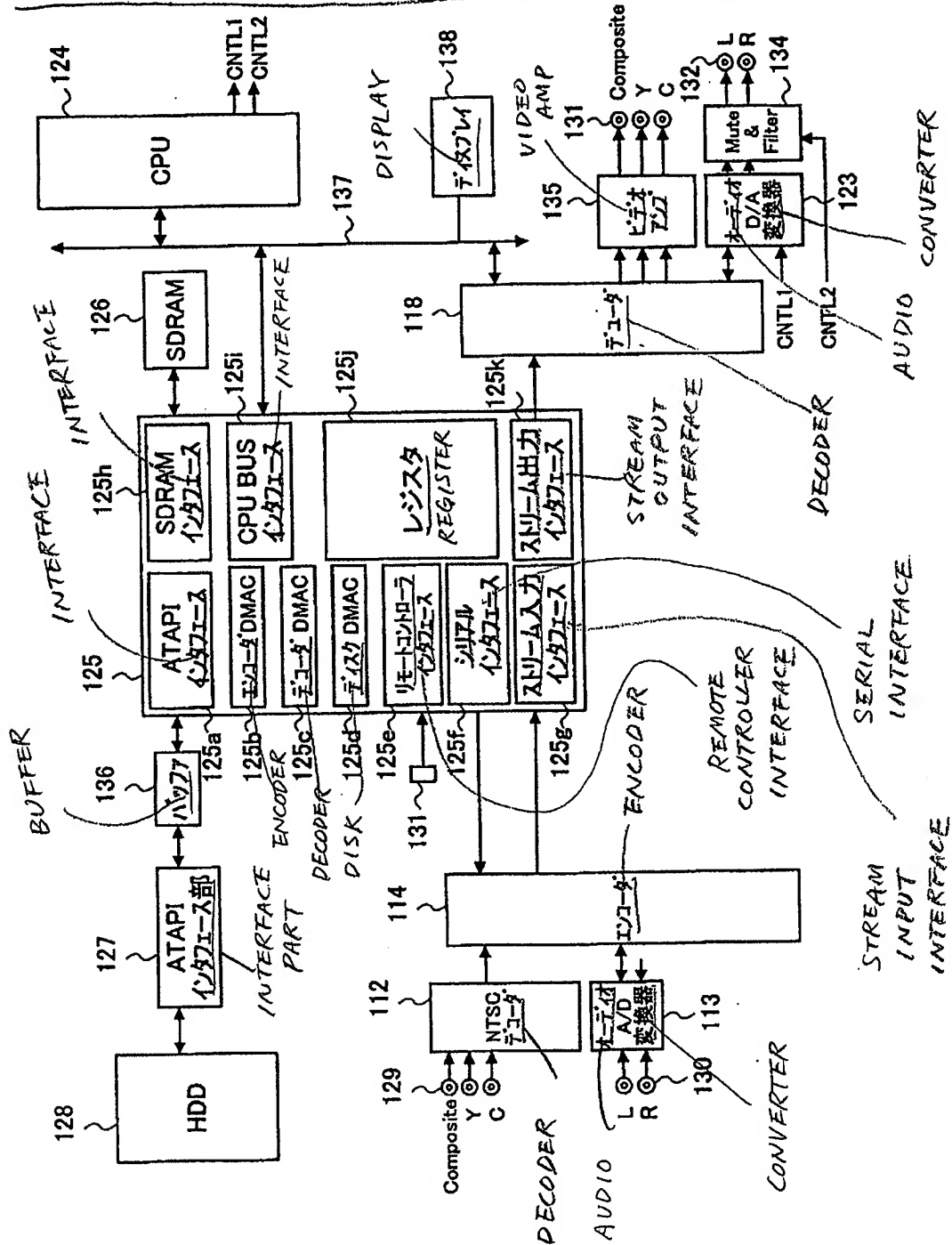
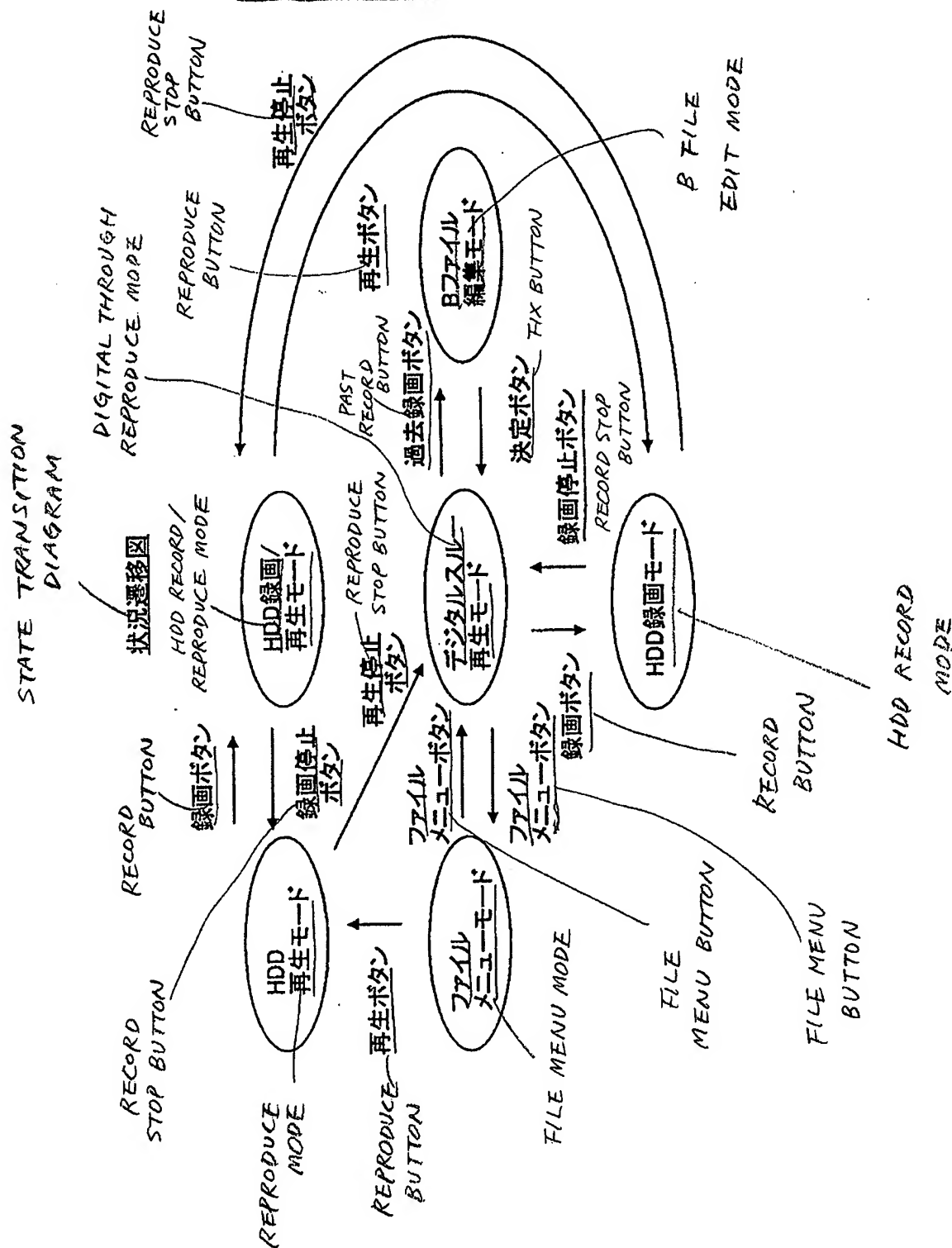


FIG. 6 【図6】 ILLUSTRATION OF A RELATIONSHIP BETWEEN RESPECTIVE OPERATION MODES OF THE IMAGE RECORDING APPARATUS SHOWN IN FIG. 5 AND BUTTONS ON A REMOTE CONTROLLER

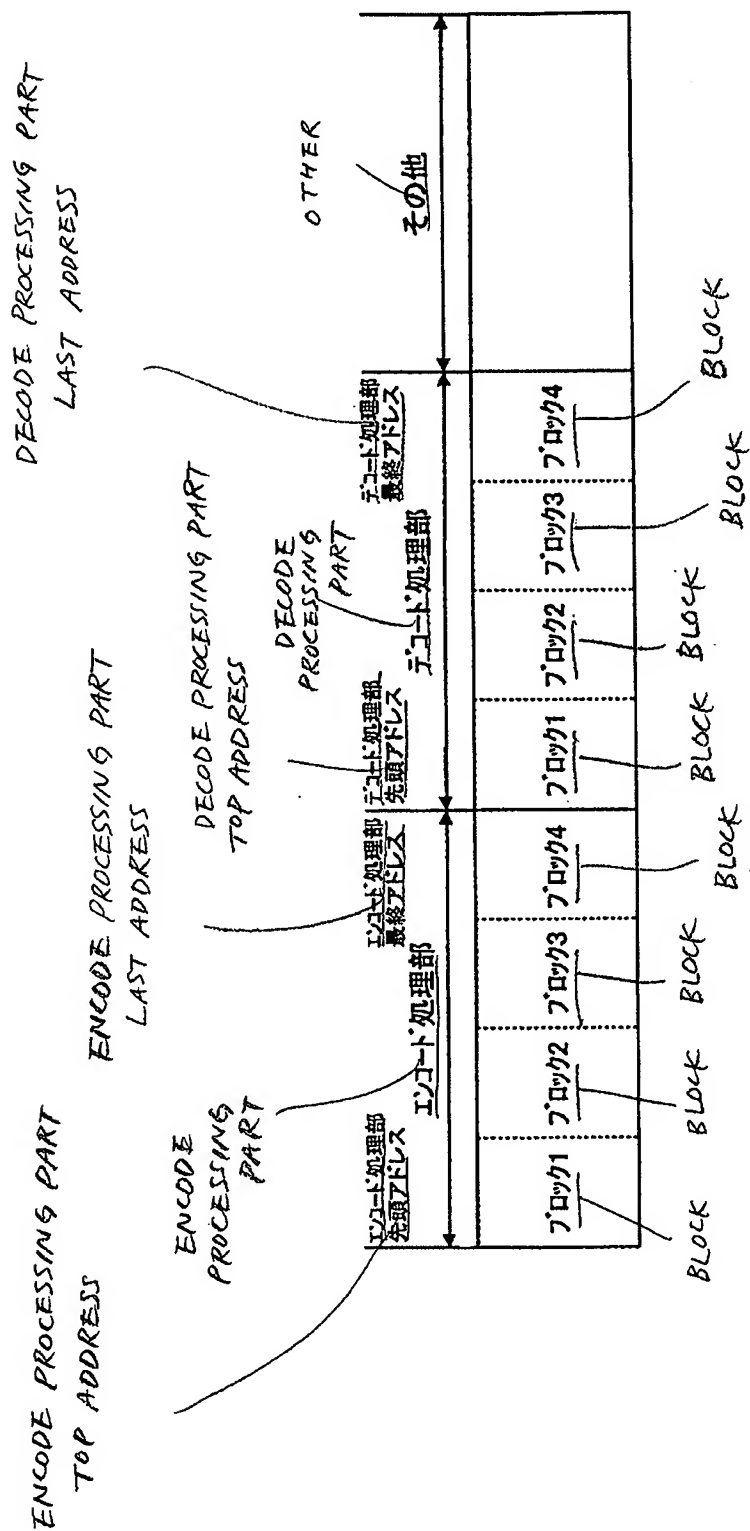
図5に示す画像記録装置のモードとリモートコントローラのボタンとの関係を示す図



【図7】FIG.7

DIAGRAM SHOWING DATA ALLOCATION IN A WORK AREA ON AN SDRAM SHOWN IN FIG. 5

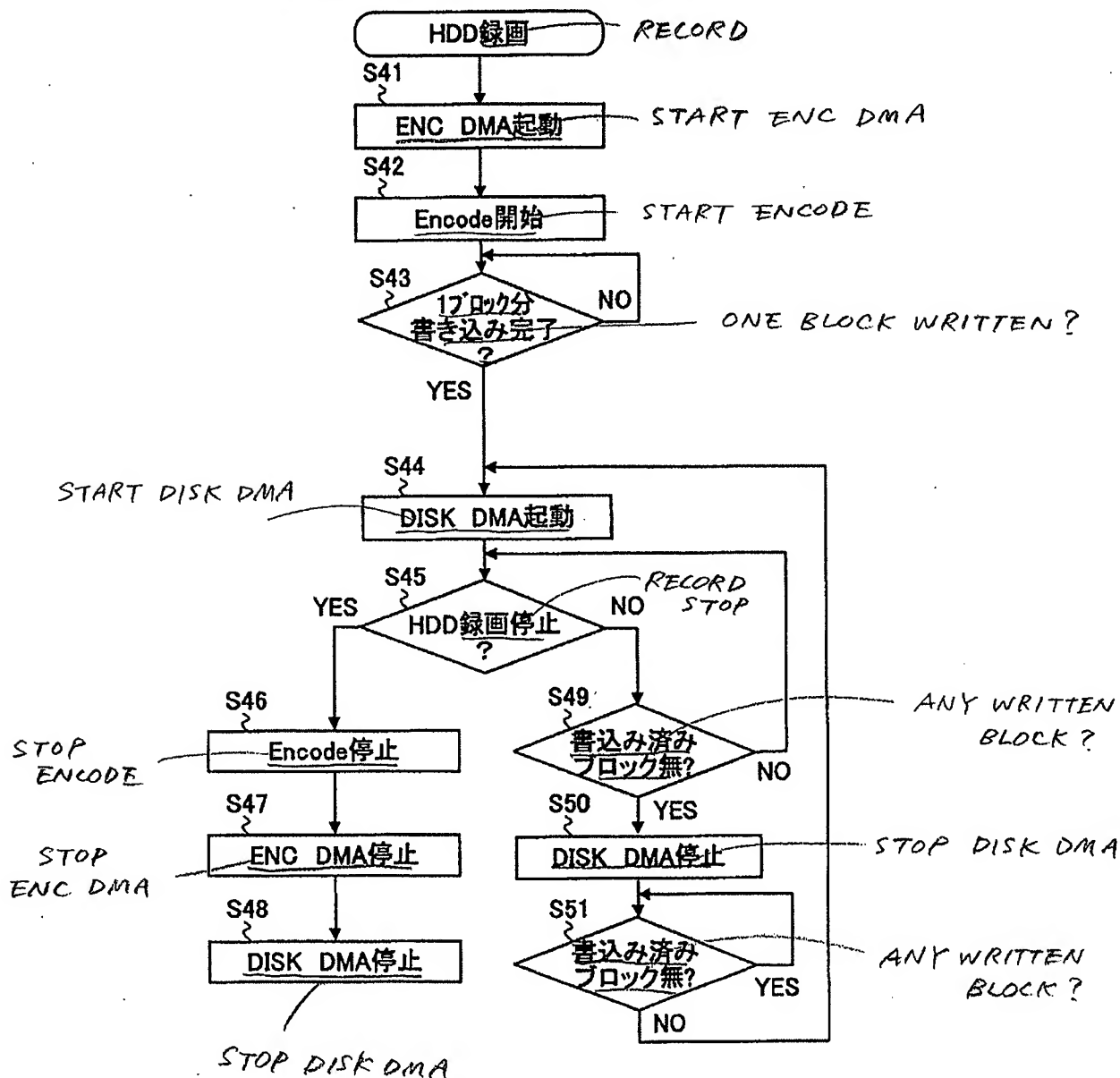
図5に示すSDRAMの作業領域の割り当てを示す図



【図8】 FIG. 8

FLOW CHART WHICH SHOWS AN HDD RECORDING OPERATION OF THE IMAGE RECORDING APPARATUS SHOWN IN FIG. 5

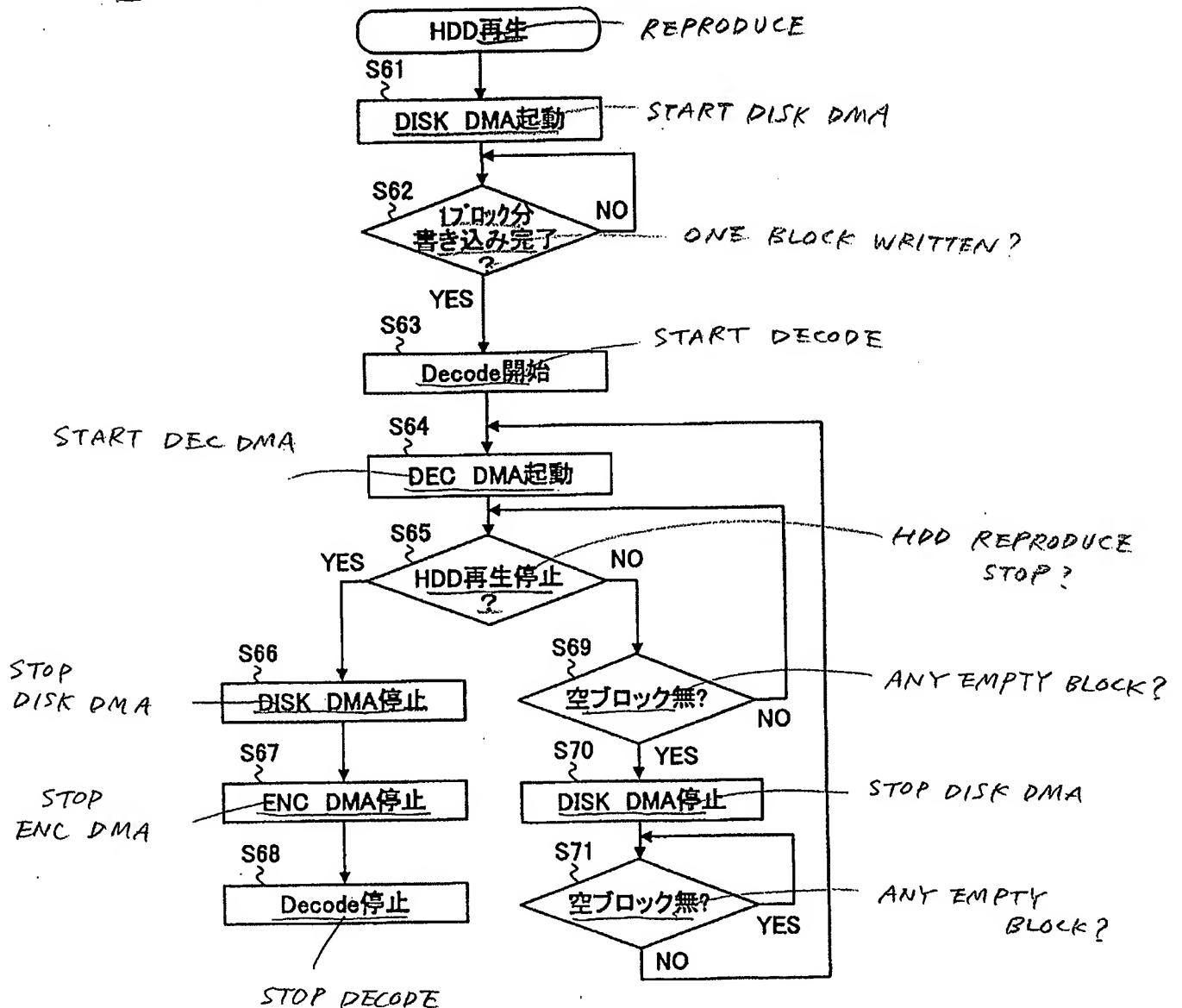
図5に示す画像記録装置のHDD録画動作を示すフローチャート ↑



【図9】 FIG. 9

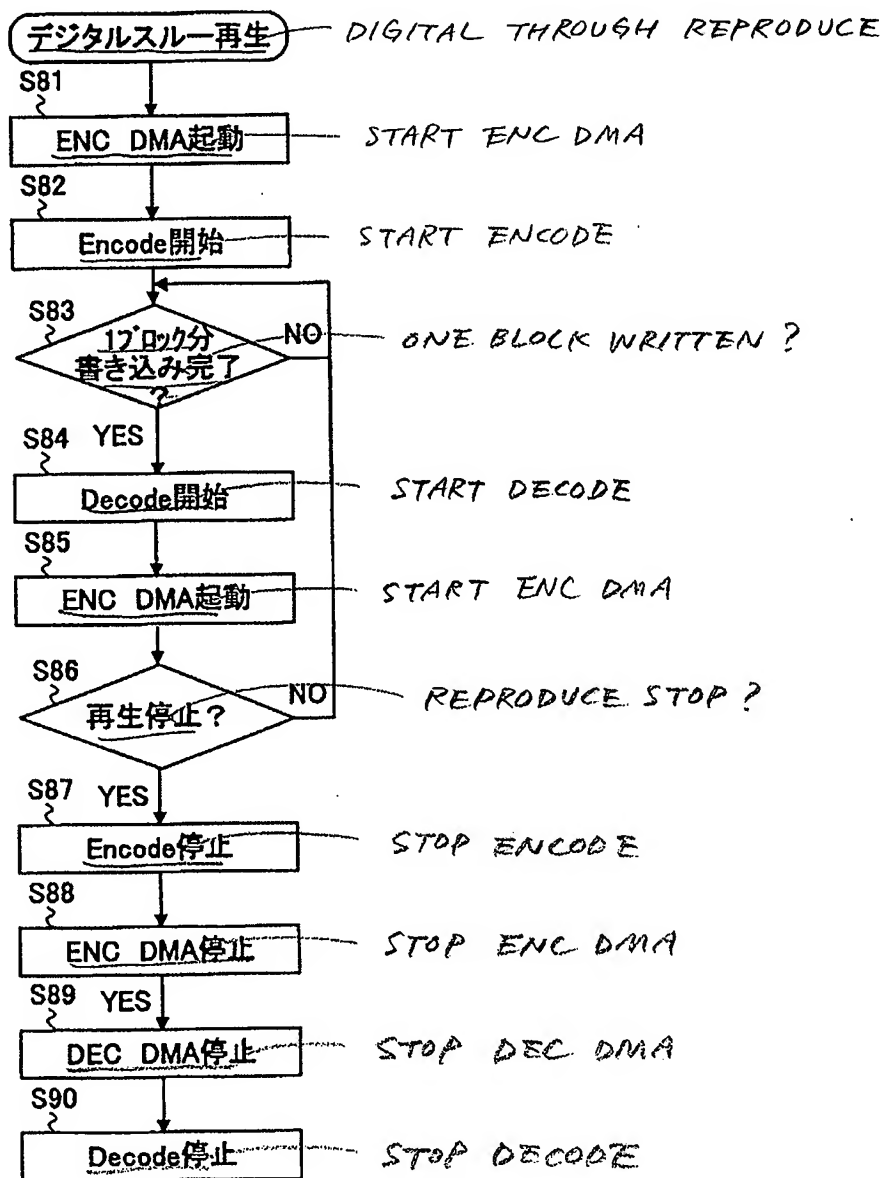
FLOW CHART WHICH SHOWS AN HDD REPRODUCTION OPERATION OF THE IMAGE RECORDING APPARATUS SHOWN IN FIG. 5

図5に示す画像記録装置のHDD再生動作を示すフローチャート



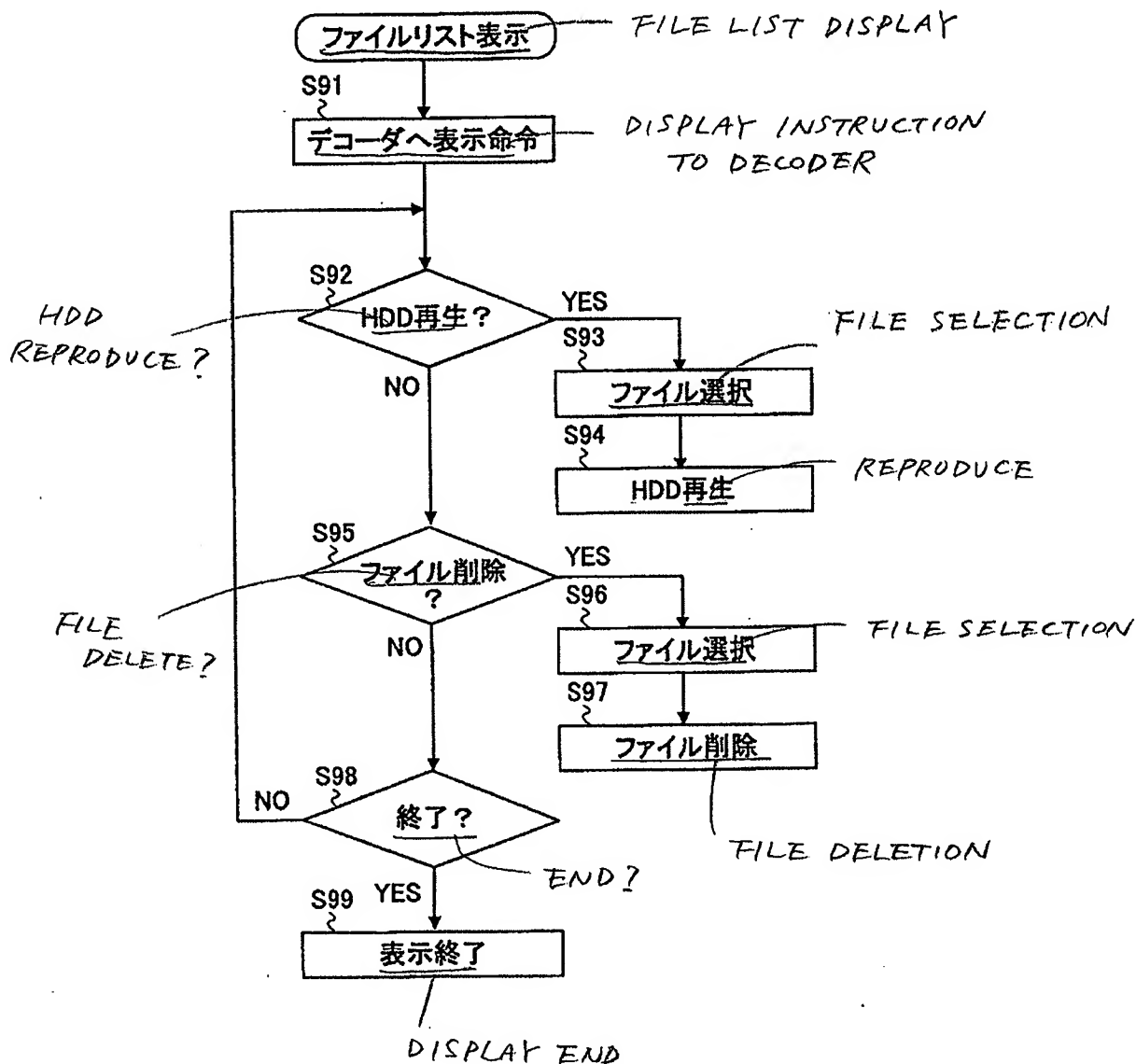
【図10】 FLOW CHART WHICH SHOWS A DIGITAL THROUGH
FIG. 10 REPRODUCTION OPERATION OF THE IMAGE RECORDING
APPARATUS SHOWN IN FIG. 5

図5に示す画像記録装置のデジタルスルー再生動作
を示すフローチャート



【図11】 FLOW CHART WHICH SHOWS A FILE LIST DISPLAY
FIG. 11 OPERATION OF THE IMAGE RECORDING APPARATUS
SHOWN IN FIG. 5

図5に示す画像記録装置のファイルリスト表示動作
を示すフローチャート



【図12】 ILLUSTRATIONS OF A RECORDING AREA OF AN HDD OF
FIG. 12 THE IMAGE RECORDING APPARATUS SHOWN IN FIG. 5

図5に示す画像記録装置のHDDの記録領域を示す図

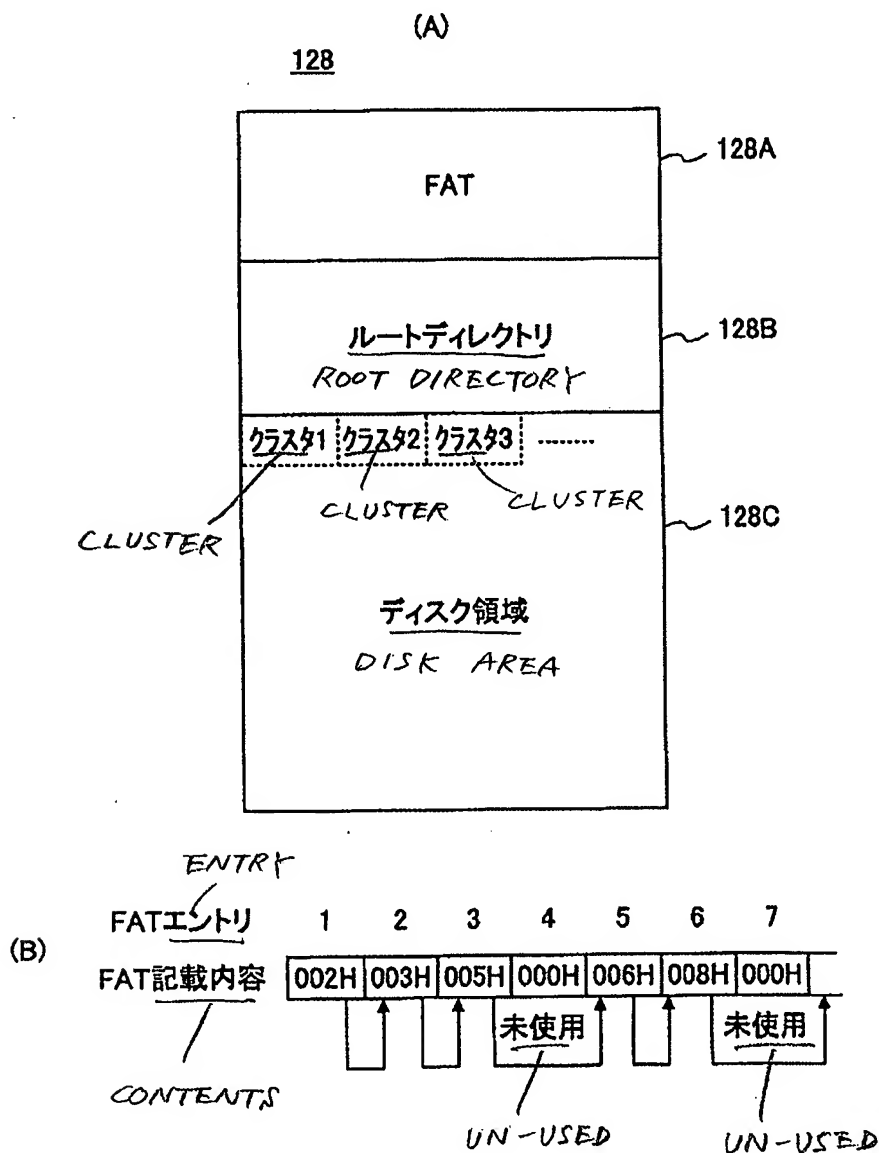


FIG.13—【図13】 ILLUSTRATIONS OF FILE STATES A AND B

RECORD START
DATE/TIME.

ファイル状態A, Bを説明するための図

①録画ファイルリスト表示例 → DISPLAY EXAMPLE OF RECORD FILE LIST

FILE NAME	ファイル名	録画開始日時	録画長	録画モード	RECORD LENGTH
FILE	ファイル1	00/02/19 21:00	2:00	HQ	RECORD MODE
(A)	ファイル2	00/02/25 19:00	1:35	LP	
FILE	ファイル3	00/03/09 10:00	2:00	HQ	
	FILE				

②Bファイル編集の表示例 → DISPLAY EXAMPLE OF B FILE EDIT

保存可能時間帯 — STORABLE TIME ZONE
00/03/09 12:00 ~ 00/03/09 20:00

RECORD START DATE/TIME (B) 保存時間帯を設定してください SET STORAGE TIME ZONE

録画開始日時 録画終了日時

00/03/09 18:00 00/03/09 19:00

151 152

RECORD END DATE/TIME

③録画ファイルリスト表示例 → DISPLAY EXAMPLE OF RECORD FILE LISTS

FILENAME	ファイル名	録画開始日時	録画長	録画モード	RECORD LENGTH
FILE	ファイル1	00/02/19 21:00	2:00	HQ	RECORD MODE
(C)	ファイル2	00/02/25 19:00	1:35	LP	
FILE	ファイル3	00/03/09 10:00	2:00	HQ	
FILE	ファイル4	00/03/09 18:00	1:00	LP	
	FILE				

RECORD START DATE/TIME

【図14】FIG.14

ILLUSTRATIONS OF AN EXAMPLE OF FILES
STORED IN HDD

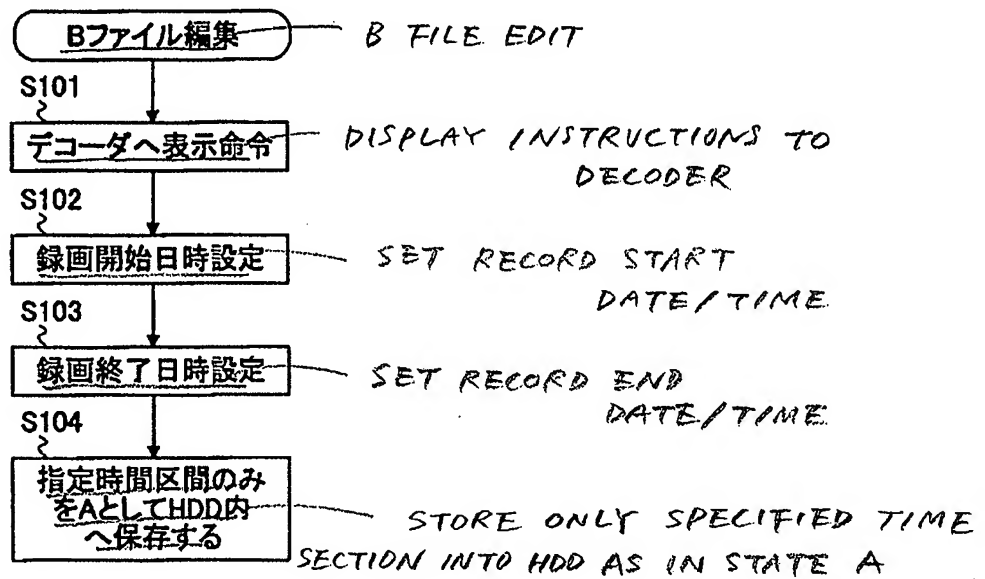
HDDに格納されたファイルの一例を示す図

		FILE NAME	RECORD START DATE/TIME	RECORD END DATE/TIME	RECORD MODE	STATE
		(A)				
FILE		ファイル名	録画開始日時	録画終了日時	録画モード	状態A/B
FILE	1	ファイル1	2000/2/19 21:00	2000/2/19 23:00	HQ	A
FILE	2	ファイル2	2000/2/25 19:00	2000/2/25 20:35	LP	A
FILE	3	ファイル3	2000/3/9 10:00	2000/3/9 12:00	HQ	A
	4	ファイル4	2000/3/9 12:00	2000/3/9 20:00	LP	B

		FILE NAME	RECORD START DATE/TIME	RECORD END DATE/TIME	RECORD MODE	STATE
		(B)				
FILE		ファイル名	録画開始日時	録画終了日時	録画モード	状態A/B
FILE	1	ファイル1	2000/2/19 21:00	2000/2/19 23:00	HQ	A
FILE	2	ファイル2	2000/2/25 19:00	2000/2/25 20:35	LP	A
FILE	3	ファイル3	2000/3/9 10:00	2000/3/9 12:00	HQ	A
	4	ファイル4	2000/3/9 19:00	2000/3/9 20:00	LP	A

【図15】 FLOW CHART WHICH SHOWS B FILE EDIT OPERATION
FIG.15 OF THE IMAGE RECORDING APPARATUS SHOWN IN
FIG.5

図5に示す画像記録装置のBファイル編集動作
を示すフローチャート



[Name of the Document] Abstract

[Abstract]

[Object] An image recording apparatus is provided,
by which, even when input image signals are coded,
5 compressed, decompressed, and decoded to pass
through to outside, the image quality is not
degraded problematically.

[Solution Means] An image recording apparatus
includes a coding/decoding part (14, 18) having a
10 plurality of coding/decoding modes of different bit
rates; a recording medium (28) coupled with said
coding/decoding part; and a control part (25)
setting a predetermined bit rate to be applied by
said coding/decoding part in case the given image
15 signal is output after being coded and decoded
without storage thereof in said recording medium.

[Selected Figure] Fig. 1